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This article capsules six recent research reports on the nature of teaching as observed in the classroom. The reports--by principal investigators Bellack, Jackson, Waimon, Perkins, Smith, and Taba--focus on meaning and classroom language (THE LANGUAGE OF THE CLASSROOM: MEANINGS COMMUNICATED IN HIGH SCHOOL TEACHING), patterns of teacher-pupil communication ("Teacher-Pupil Communication in the Elementary Classroom: An Observational Study"), observation as teacher training ("A Conceptual System for Prospective Teachers To Study Teaching Behavior"), role behavior and class activity as related to achievement ("Classroom Behavior and Underachievement"), teacher strategies (A TENTATIVE REPORT ON THE STRATEGIES OF TEACHING), and cognitive processes (THINKING IN ELEMENTARY SCHOOL CHILDREN). Details on test population, setting, procedure, and results are summarized for each report. A 17-item reference list is included. ED 003 273, 015 164, 003 285 are related documents. (LP)

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THE OBSERVATION OF CLASSROOM BEHAVIOR

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Some Recent Research

Writing in 1904 on the relationship between theory and practice, Dewey recommended that a basic element in teacher training should be the observation of classroom behavior. He stressed that this observation "should not be too definitely practical in aim." Rather, it should be done "with reference to seeing the interaction of mind, to see how teacher and pupils react to each other—how mind answers mind" (p. 26). Obviously, Dewey was not concerned here with the commonsense notion of the experienced teacher passing on the "tricks of the trade" to the novice. Instead, he saw the observation of teaching as contributing to a sense of the nature of teaching—to an insight into the special kind of world that one finds in the classroom.

Implicit in Dewey's proposal is a kind of framework or system of analysis through which this observation could be carried on. Although observation schedules and systems appeared in the literature of the early part of this century, they frequently took

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the form of supervisors' checklists designed to rate teachers rather than to study teaching. It has been largely within the past decade that descriptive studies involving the observation of classroom teaching and the development of instruments of analysis have become prominent. Medley and Mitzel (1963) have ably reviewed this trend and discussed its implications.

While the studies involving the observation of classroom behavior all reflect, in a sense, a common research orientation, they tend to differ in other respects. Essentially, what all the investigators undertaking such research share are a desire to understand the nature of teaching and a feeling that it can be best understood by studying it directly as it goes forward in the classroom. The variety that is reflected in these studies stems generally from the predilections and interests of the investigators, but more particularly from three basic decisions which they are called upon to make. It is their approach to these decisions that tends to give each study its distinctive character.

Probably the most critical decision is that of determining the range of behaviors that will be observed. Observing everything that happens in a classroom is an obviously futile task. Any observer finds it necessary to single out certain dimensions of behavior and to ignore others. The choice reflects a central focus which may be based on philosophical, sociological, or psychological considerations. It is, of course, possible to select a completely unrelated congeries of behaviors to observe, but most investigators choose to focus on a set of behaviors which represents a given perspective. Thus one set of observations is concerned with the logic of teaching while others focus on classroom climate, or critical thinking, or communication patterns.

A second decision is concerned with the setting and population being observed. Not only are population samples drawn from various grade levels, but they frequently are selected in terms of other special interests of the investigators. Certain studies, for example, observe classes grouped only in given subject areas; other investigators are interested in observing gifted students or underachievers. At times the setting and population samples are central to the overall framework of the study and sometimes more or less incidental to the research design.

The third source of variety in investigations of classroom behavior is the observational technique or procedure. Basically,

there are two alternatives here: to record the observations directly in the classroom while the lesson is going on; or to perform this task indirectly through tape recordings, kinescopes, or typescripts. Sometimes a combination of both methods is used. As a rule, observational procedures tend to be a function of the kinds of behavior being observed and the complexity of the system of analysis. Obviously, if such factors as facial expression and physical movement are to be observed, then tape recordings and typescripts alone would be inadequate. On the other hand, if a complex analysis is attempted involving several dimensions of a particular unit of behavior, this would preclude direct and immediate observation as the only procedure.

If the studies reviewed here, then, share one perspective, it is that some understanding of the process of teaching can be gained through observation of what goes on in the classroom. This shared perspective, however, does not preclude wide differences in such matters as which behaviors will be observed and which will be ignored, what students and teachers will be observed in what kind of classroom setting, and what techniques or procedures will be used in making the observations. The decisions that investigators make with respect to such questions as these cannot normally be described as good or bad, right or wrong. These decisions simply reflect basic interests and concerns of those who make them.

In *The Language of the Classroom: Meanings Communicated in High School Teaching*, Bellack, Davitz, Kliebard, and Hyman (1963) are concerned primarily with various kinds of meaning as they are conveyed through the language that teachers and pupils use. Their decision to focus on this dimension of teaching is based on at least two assumptions. The first is that the principal function of language is the communication of meaning. Analysis of the language of the classroom, therefore, offers the most promising way of studying the communication of meaning. This, they point out, is consistent with Wittgenstein's notion that "the meaning of a word is its use in the language" (1953, p. 20). Second, they use Wittgenstein's description of various kinds of verbal activity as "language games" as a basis for treating teaching as a game in the sense that it is a form of rule-governed behavior. Much of the study, therefore, is concerned with delineating the ground rules of teaching and with

describing the respective roles that the teacher and student players play when engaged in the game of teaching.

The classes studied were drawn from seven high schools in the New York metropolitan area. Fifteen tenth- and twelfth-grade classes in problems of American democracy comprised the final sample. The teacher in each of these classes was asked to teach a four-day unit on international trade basing his lessons on the first four chapters of the pamphlet, *International Economic Problems,* by Calderwood. All of the 60 class sessions were recorded on tape from which typescripts were later prepared. Estimates of verbal intelligence were obtained for all of the students involved, and pretests and post-tests of knowledge of international trade were administered.

With language as the central focus of the study, a key methodological problem was that of devising the unit of language behavior which would serve as the basis for the analysis. On the basis of studying sample tape recordings and typescripts of class sessions, Bellack (1965) conceived of four basic verbal maneuvers which describe what the teachers and pupils do pedagogically when engaged in the game of teaching. These maneuvers were called *pedagogical moves,* a term consistent with the game metaphor. Further analysis of the tape recordings and typescripts indicated that all of the observed verbal behavior by both teachers and pupils could be classified in terms of these moves. The four pedagogical moves are described as follows (p. 4):

> *Structuring.* Structuring moves serve the pedagogical functions of setting the context for subsequent behavior by launching or halting-excluding interaction between students and teachers. For example, teachers frequently begin a class period with a structuring move in which they focus attention on the topic or problem to be discussed during that session.
>
> *Soliciting.* Moves in this category are designed to elicit a verbal response, encourage persons addressed to attend to something, or elicit a physical response. All questions are solicitations, as are commands, imperatives and requests.
>
> *Responding.* These moves bear a reciprocal relationship to soliciting moves and occur only in relation to them. Their pedagogical function is to fulfill the expectation of soliciting moves. Thus, students' answers to teachers' questions are classified as responding moves.

Reacting. These moves are occasioned by a structuring, soliciting, responding, or another reacting move, but are not directly elicited by them. Pedagogically, these moves serve to modify (by clarifying, synthesizing, or expanding) and/or to rate (positively or negatively) what has been said previously. Reacting moves differ from responding moves, in that while a responding move is always directly elicited by a solicitation, preceding moves serve only as the occasion for reactions. Rating by a teacher of a student's response, for example, is designated a reacting move.

Pedagogical moves not only provided the basic unit of analysis but served to describe the first of the dimensions of meaning with which Bellack and his associates were concerned, pedagogical meaning. This refers to the distinctively didactic sense of the verbal unit. In addition, pedagogical moves are combined into larger units of discourse called *teaching cycles.* This is done by viewing two of the moves, structuring and soliciting, as initiatory moves, and the other two, responding and reacting, as reflexive. A typical teaching cycle, then, might consist of a teacher solicitation followed by a pupil response which in turn is followed by the teacher's reaction to the responding move. A new cycle begins when a new initiatory move is made.

A second dimension of meaning with which the investigators were concerned was the content of what was being said. Two basic subdivisions were identified: substantive meanings—that is, the subject matter under discussion (international trade)—and instructional meanings—the routine managerial statements such as those concerned with assignments and procedures. The substantive and the instructional meanings were observed and recorded along with their associated logical meanings. Thus if a pupil replied to a teacher's question by giving a definition of tariffs, the pedagogical meaning is recorded as *responding,* the substantive meaning as *tariffs,* and the logical process as *defining.* In addition, the pupil is designated as the speaker, and the length of his utterance, in lines of transcript, is also recorded.

The complete system of analysis is presented below in summary form (pp. 10-13):*

(1) SPEAKER: indicates source of utterance

Teacher (T); Pupil (P); Audio-Visual Device (A)

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* Underlining indicates actual coding terminology.

(2) TYPE OF PEDAGOGICAL MOVE: reference to function of move

Initiatory Moves

Structuring (STR): sets context for subsequent launches, halts/excludes

Soliciting (SOL): directly elicits verbal, physical or mental response; coded in terms of response expected

Reflexive Moves

Responding (RES): fulfills expectation of solicitation; bears reciprocal relation only to solicitation

Reacting (REA): modifies (by clarifying, synthesizing, expanding) and/or rates (positively or negatively); occasioned by previous move but not directly elicited; summaries or reactions to more than one previous move coded REA

Not Codable (NOC): function uncertain because tape inaudible

(3) SUBSTANTIVE MEANING: Reference to subject matter topic. (Based on a content analysis of the pamphlet by Calderwood)

Trade (TRA)

Trade–Domestic and International (TDI)

Trade–Money and Banking (TMB)

Trade–Who Trades with Whom (TWH)

Factors of Production and/or Specialization (FSP)

Factor of Production–Natural Resources (FNR)

Factor of Production–Human Skills (FHS)

Factor of Production–Capital Equipment (FCE)

Factors Other Than Natural Resources, Human Skills, and Capital Equipment Occurring in Discussion of Reasons for Trade (FRE)

Imports and/or Exports (IMX)

Foreign Investment–General (FOR)

Foreign Investment–Direct (FOD)

Foreign Investment–Portfolio (FOP)

Barriers to Trade (BAR)

Barrier–Tariffs (BAT)

Barrier–Quotas (BAQ)

Barrier–Exchange Control (BAE)

Barrier–Export Control (BAX)

Barrier–Administrative Protectionism (BAA)

Promoting Free Trade (PFT)

Relevant to Trade (REL)

Not Trade (NTR)

(4) SUBSTANTIVE-LOGICAL MEANING: reference is cognitive process involved in dealing with the subject matter under study

Analytic Process: proposed use of language or established rules of logic

Defining-General (DEF): defining characteristics of class or term with example of items within class explicitly given

Defining-Denotative (DED): object referent of term

Defining-Connotative (DEC): defining characteristics of class or term

Interpreting (INT): verbal equivalent of a statement, slogan, aphorism, or proverb

Empirical Process: sense experience as criterion of truth

Fact Stating (FAC): what is, was, or will be without explanation or evaluation; account, report, description, statement of event or state of affairs

Explaining (XPL): relation between objects, events, principles, conditional inference; cause-effect; explicit comparison-contrast; statement of principles; theories or laws

Evaluative Process: set of criteria or value system as a basis for verification

Opining (OPN): personal values for statement of policy, judgment or evaluation of event, idea, state of affairs; direct and indirect evaluation included

Justifying (JUS): reasons or argument for or against opinion or judgment

Logical Process Not Clear (NCL): cognitive process involved not clear

(5) NUMBER OF LINES IN (3) AND (4) ABOVE

(6) INSTRUCTIONAL MEANINGS: reference to factors related to classroom management

Assignment (ASG): suggested or required student activity; reports, tests, readings, debates, homework, etc.

Material (MAT): teaching aids and instructional devices

Person (PER): person as physical object or personal experiences

Procedure (PRC): a plan of activities or a course of action

Statement (STA): verbal utterance, particularly the meaning, validity, truth or propriety of an utterance

Logical Process (LOG): function of language or rule of logic; reference to definitions or arguments, but not presentation of such

Action-General (ACT): performance (vocal, non-vocal, cognitive, or emotional) the specific nature of which is uncertain or complex

Action-Vocal (ACV): physical qualities of vocal action

Action-Physical (ACP): physical movement or process

Action-Cognitive (ACC): cognitive process, but not the language or logic of a specific utterance; thinking, knowing, understanding, listening

Action-Emotional (ACE): emotion or feeling, but not expression of attitude or value

Language Mechanics (LAM): the rules of grammar and/or usage

(7) INSTRUCTIONAL-LOGICAL MEANING: reference to cognitive processes related to the distinctly didactic verbal moves in the instructional situation

Analytic Process: see (4) above

Defining-General (DEF)

Defining-Denotative (DED)

Defining-Connotative (DEC)

Interpreting (INT)

Empirical Process: see (4) above

Fact Stating (FAC)

Explaining (XPL)

Evaluative Process

Opining (OPN): see (4) above

Justifying (JUS): see (4) above

Rating: reference to metacommunication; usually an evaluative reaction (REA)

Positive (POS): distinctly affirmative evaluation

Admitting (ADM): mild or equivocally positive evaluation

Repeating (RPT): implicit positive evaluation when statement (STA) is repeated by another speaker; also for SOL to repeat vocal action (ACV)

Qualifying (QUAL): explicit reservation stated in evaluation; exception

Not Admitting (NAD): evaluation which rejects by stating the contrary; direct refutation or correction excluded

Negative (NEG): distinctly negative evaluation

Positive/Negative (PON): SOL requesting positive or negative evaluation

Admitting/Not Admitting (AON): SOL asking to permit procedure or action

Extralogical Process: SOL expecting physical action or when logical nature of verbal response cannot be determined

Performing (PRF): asking, demanding; explicit directive or imperative

Directing (DIR): SOL with or without stated alternatives; asking for directive, not permission for specific action

(8) NUMBER OF LINES IN (6) AND (7) ABOVE

Each pedagogical move is coded as follows:

(1) / (2) / (3) / (4) / (5) / (6) / (7) / (8)

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(1) Speaker
(2) Type of Pedagogical Move
(3) Substantive Meaning
(4) Substantive-Logical Meaning
(5) Number of Typescript Lines in (3) and (4)
(6) Instructional Meaning
(7) Instructional-Logical Meaning
(8) Number of Typescript Lines in (6) and (7)

The following is an example of the coding system applied to a verbal exchange:

#1 T: What is a tariff?	T/SOC/BAT/DEF/1/-/-/-/
#2 P: A Tax.	P/RES/BAT/DEC/1/-/-/-/
#3 T: Good.	T/REA/BAT/-/-/STA/POS/1

The coding could be interpreted as follows:

Move #1—Teacher solicitation calling for definition of a term relating to tariffs—one line

Move #2—Pupil responding move giving connotative definition relating to tariffs—one line

Move #3—Teacher reacting move giving positive rating of previous statement—one line

To determine reliability of the coding system, 12 five-page samples of transcript were selected at random. Two teams of two members coded each of the samples, and their results were compared. The percentage of agreement was calculated for each of the basic categories of the system of analysis: pedagogical moves, substantive meanings, substantive-logical meanings, instructional meanings, and instructional-logical meanings. In terms of moves, the percentage of agreement ranged from 0.87 to 0.95. In terms of lines of transcript, the range was from 0.84 percent to 0.96 percent.

The development of the system of analysis was the primary task of the early stages of this research. Nevertheless, once processed by the IBM 7090 computer, the analysis of the 60 class sessions yielded some interesting descriptive data. The 15 teachers, for example, made about 50 percent more moves than the 345 pupils and spoke three times as many lines. Soliciting, responding, and reacting moves accounted for roughly 90 percent of the moves, and structuring about 10 percent. By and large, it was the teachers who made the structuring, soliciting, and reacting moves, and the pupils' role was confined largely to responding. Of 21 possible teaching cycles or patterns of moves, only two, solicitation-response-reaction and solicitation-response, accounted for more than half of the total of 4,592 teaching cycles. Approximately three-quarters of the discourse in terms of lines was given over to substantive as opposed to instructional meanings. About half of all moves were classified in the substantive-empirical mode (fact stating and explaining) rather than analytic (defining and interpreting) or evaluative (opening and justifying). The analysis is designed to provide not only a picture of linguistic behavior in the sample classes as a whole, but some clues as to how teaching styles differ from one classroom to another.

Like the work of Bellack and his associates, Jackson's research (1965), "Teacher-Pupil Communication: An Observational Study," provides some basis for describing and analyzing patterns of communication in the classroom. Jackson's study, however, is more restricted in its focus and uses a different type of population sample.

One of the first tasks was that of grouping or categorizing the various communications that take place between teachers and pupils. Jackson identified three types of verbal communication between teachers and pupils:

1. Instructional messages—communications referring to content or intended to attain educational objectives
2. Group management messages—communications having to do with setting procedures and rules
3. Classroom control messages—communications having to do with maintaining discipline and keeping order.

Aside from the type of communication, two other dimensions of the activity were identified: (a) the recipient of the teacher's message (whether a boy, a girl, or a group), and (b) the initiator of the message (whether a boy, a girl, or the teacher). In addition, the type of activity in which the class was engaged (e.g., recitation, group work, and so on) was recorded as well as when shifts took place from one type of activity to another.

Jackson's population sample was drawn from a private elementary school and included one first-grade, one second-grade, and two fourth-grade classes. The observations were made and recorded directly in the classrooms themselves rather than through tape recordings or transcripts. Over the two-month period during which data were collected, each classroom was visited at least 15 times for periods ranging from a few minutes to a whole day. The four classes were observed for a total of 1,467 minutes.

Over this period, an entry was made each time there was a verbal exchange between the teacher and pupils in the class. Confirming the impression gained by casual observation of classroom activity, Jackson's study shows that the rate of verbal communications is remarkably high. Communication rates ranged from 3.08 communications per minute for the second-grade class to 3.66 for the first-grade class. Although the differences seem significant at first glance, Jackson's analysis also shows that the rate of communications during any given class activity was very much the same from class to class. Differences in the overall rate of communication tended to be a function of the proportion of time devoted to seatwork as opposed to activities involving

the class as a whole. Since seatwork usually involves fewer teacher-pupil communications than whole class work, those classes which devoted a proportionally greater amount of time to seatwork tended to have slower overall rates. Taking only the rates for whole class activity, the four classes were remarkably similar in the average rate of communications per minute (3.64, 3.80, 3.83, 3.65). Further examination of the data also revealed that communications which lasted for as much as one minute accounted for a small percentage of the total time. Typically, then, these classes were characterized by short and frequent communication between teachers and pupils.

Another matter of concern to observers of classroom behavior is the extent to which a class is "teacher-dominated" or "pupil-dominated." Although Jackson's sample was drawn from a private school with a reputation for being child-centered, the four classes he observed tended to be "teacher-dominated" in terms of the initiator of verbal communication. In the most "pupil-dominated" class, 55.2 percent of the communications were initiated by the teacher; in the most "teacher-dominated" class, the percentage was 80.7. The percentages of teacher-initiation in the two fourth-grade classes were 67.2 and 65.2.

In terms of the type of communication, Jackson found that the range for instructional communications was 50.4 to 69.1; for management it was 20.0 to 33.5, and for control, the range was 10.9 to 16.6 percent. Taking management and control communications together, it was found that they account for at least 30 percent of all communications in each of the four classes. In the first-grade class, the percentage of instructional communications was only 50.4.

The picture that emerges from this study is one where teachers and pupils engage in a series of rapid-fire verbal interchanges (about 200 an hour) and that about one-half to one-third of these communications are other than instructional in character. The similarity in communication rates in the four classes suggests the hypothesis that this rapid pace is characteristic of teaching in elementary schools generally rather than a peculiarity of a limited number of classes. This similarity in rate and pattern of verbal behavior from one class to another is consistent with the findings of Bellack and his associates in their study of high school classes.

Increasing attention has been given lately to the observation of classroom behavior as a basis for teacher training (LaGrone, 1964). Although the typical professional sequence of education courses provides for the study of the schools as a social institution, for development of skills in use of materials, for planning for teaching, comparatively little attention is given to direct and systematic study of teaching itself as it occurs in the classroom. The research study, "A Conceptual System for Prospective Teachers To Study Teaching Behavior," by Waimon and Hermanowicz (1965) attempts to fill this gap by providing prospective teachers with a system for analyzing classroom behavior and training in the use of that system.

The basic framework for the system was derived largely from Miller's conception of learning as comprising drive, cue, response, and reward. Since the investigators regard teaching as the obverse of learning, their system focused on the teacher's attempts to induce learning "by developing a predisposition (drive), helping students acquire, comprehend, or use subject matter (cue and response), and giving evaluative reactions to pupil responses (reward)."

Using this approach, three major types of verbal behavior by teachers were identified:

1. Procedural statements, in which teachers set goals, gain attention, and so on.

2. Substantive statements, which have to do with subject matter. This includes such operations as fact stating and explaining.

3. Rating statements, which are the teacher's evaluations of the student responses.

The complete observation schedule including subcategories is summarized by the investigators as follows (pp. 18-19):

1. PROCEDURAL (PRO) The teacher develops and maintains a predisposition for learning.
   - 1.1 *Activating* (Act) The teacher makes pupil goals similar to his own.
     - 1.11 teacher gains attention
     - 1.12 teacher gives instruction
     - 1.13 teacher states goals
     - 1.14 teacher poses a problem

1.15 teacher points out importance of goals
1.16 teacher invites pupil to react to goals

1.2 *Maintaining* (Mai) The teacher keeps pupil goals similar to his own.

1.21 teacher prevents pupil from moving class in a new direction
1.22 teacher reminds pupil to continue to pay attention
1.23 teacher comments on the cause of unsatisfactory progress
1.24 teacher offers encouragement
1.25 teacher points out progress being made
1.26 teacher invites questions or acknowledges pupil with a question

2. SUBSTANTIVE (SUB) The teacher helps pupil acquire, comprehend, or use subject matter.

2.1 *Informing* (Inf) The teacher tells pupil subject matter to be remembered.

2.11 teacher defines terms
2.12 teacher states facts or generalizations
2.13 teacher explains facts or generalizations
2.14 teacher evaluates a subject

2.2 *Cuing* (Cu) The teacher asks pupil questions requiring a substantive response.

2.21 teacher helps pupil recall subject matter
2.22 teacher helps pupil demonstrate comprehension of subject matter
2.23 teacher helps pupil discover new subject matters
2.24 teacher helps pupil apply subject matter to problem solving

2.3 *Reacting Informing* (R. Inf) The teacher improves a pupil substantive response.

2.31 teacher rephrases, or restates pupil response
2.32 teacher adds new information to pupil response
2.33 teacher relates various pupil responses

2.4 *Reacting Cuing* (R. Cu) The teacher helps a pupil improve a substantive response.

2.41 teacher helps pupil to rephrase, or restate response
2.42 teacher helps pupil add new information to a response
2.43 teacher solicits additions to a response from other pupils

3. RATING (RAT) The teacher gives an evaluative reaction to a substantive response.

3.1 *Positive* (Po) The teacher lets pupil know a substantive response is correct.

3.11 teacher gives an explicitly positive rating (Yes, Right, A good answer)

3.12 teacher gives a mild or equivocally positive rating (Alright, O.K., Uh-huh)

3.2 *Negative* (Neg) The teacher lets pupil know a substantive response is incorrect.

3.21 teacher gives an explicitly negative rating (No, Wrong, That's a terrible answer)

3.22 teacher indicates a reservation (Yes, but . . . however . . . nevertheless . . . That's one way of saying it)

3.23 teacher disagrees with a response (England is *not* in the Common Market)

3.3 *Neutral* (Neu) The teacher acknowledges a pupil response but does not let the pupil know it is correct or incorrect.

3.31 teacher gives a positive reaction to part of a response, a negative reaction to another part

3.32 teacher acknowledges having heard the response without evaluating it (repeats the response)

3.33 teacher gives an ambiguous evaluation to response (Oh).

In addition to the teacher categories, two categories of pupil responses were identified: adequacy and magnitude. The former is based on a judgment as to whether the response fulfills the expectation of the teacher. The latter, which is limited to substantive responses, is based on whether the response requires knowledge, comprehension, or reasoning.

Waimon and Hermanowicz also identified larger verbal units which they called teaching episodes. These were defined as verbal units which are initiated by activating, cuing, or informing and terminate with a flexive move. Essentially, each episode represents an effort on the part of the teacher to elicit an appropriate response. Once these episodes are identified, they are classified in terms of the difficulty that was encountered in eliciting that response. Type A is assigned to those episodes where no difficulty is encountered, type B where some difficulty is encountered, and type C where great difficulty is encountered.

In computing reliability, the investigators compared their own coding of a three-page segment of a lesson with the coding

of the 28 students involved in the study. In terms of lines of transcript, the coefficients of agreement ranged from 0.32 to 1.00, with a mean of 0.82. A second reliability estimate using paired student teams and the formula developed by Smith, Meux, and their associates (1962) yielded a mean coefficient of agreement of 0.62 and a range of 0.49 to 0.72.

In attempting to assess the effect of their training in the observation of teaching, the investigators administered pretests and post-tests to the 28 students using five different instruments designed to measure critical thinking (*Watson-Glaser Critical Thinking Appraisal*), knowledge of research procedures (Patton-Barnes Cognitive Inventory), the meanings which students associate with various concepts inherent in the coding system (semantic differential), general attitudes to research in curriculum (Patton-Barnes Attitude Inventory), and the students' attitudes toward teaching (*Minnesota Teacher Attitude Inventory*).

No significant changes were found in terms of critical thinking, curriculum research methodology, or attitudes toward curriculum research. However, in rating 20 concepts selected by the investigators as important to their analysis system, the subjects, using a semantic differential scale, differed significantly in the meanings they attached to the concepts. Significant changes were also observed on the post-test scores of the *Minnesota Teacher Attitude Inventory.* In none of the five areas was change related to reliability in using the system. Some of the items from *The Purdue Rating Scale for Instruction* were used to obtain further reactions from the students. The most frequent response indicated a high value attached to direct observation of classroom behavior as opposed to the analysis of typescripts.

Perkins' study of classroom behavior and underachievement (1964, 1965) uses adaptations of observation schedules by Flanders (1960), Kowatrakul (1959), and Sears (1963) to determine whether the classroom behavior of underachieving pupils differs from that of achievers. The study is described by the investigator as based on the assumptions that "(1) an individual responds to a situation in accordance with the way he perceives it; (2) areas, events, and activities that have special significance for an individual are those that facilitate or threaten his maintenance and enhancement of self; (3) behaviors that are reinforced tend to be repeated" (p. 3). As such, the kinds of behavior that

are the focus of this study deal with types of ongoing class activities (e.g., large-group discussions, seatwork, small-group or committee work, and so on) and with students' behavior (e.g., high activity or involvement, intent on work of nonacademic type, withdrawal, and so on) in the context of these activities. One observation schedule was developed for student behavior and another for teacher behavior.

Perkins' study lists student categories as follows (p. 251):

LISWAT: Interested in ongoing work: listening and watching—passive.

REWR: Reading or writing: working in assigned area—activity.

HIAC: High activity or involvement: reciting or using large muscles—positive feeling.

WOA: Intent on work in another curricular area: school activity not assigned to be done right then.

WNA: Intent on work of nonacademic type: preparing for work assignment, cleaning out desk, etc.

SWP: Social, work-oriented—PEER: discussing some aspect of schoolwork with classmate.

SWT: Social, work-oriented—TEACHER: discussing some phase of work with teacher.

SF: Social, friendly: talking to peer on subject unrelated to schoolwork.

WDL: Withdrawal: detached, out of contact with people, ideas, classroom situation; daydreaming.

DISC: Large-group discussion: entire class discusses an issue or evaluates an oral report.

REC: Class recitation: teacher questions, student answers—entire class or portion of it participating.

IND: Individual work or project: student is working alone on task that is not a common assignment.

SEAT: Seatwork, reading or writing, common assignment.

GRP: Small-group or committee work: student is part of group or committee working on assignment.

REP: Oral reports—individual or group: student is orally reporting on book, current events, or research.

The teacher categories were designed to describe the teacher's role in terms of these activities (e.g., leader-director, resource person, and so on) as well as the specific activities in which the

teacher is engaged (listens, lectures, gives directions, and so forth.)

The teacher categories are as follows (p. 251):

1. Does not accept student's idea, corrects it: rejection or correction of student's response.
2. Praises or encourages student or behavior: enthusiastic acceptance of student's response.

2A. Listens to, helps, supports, nurtures student: accepting, helping response; also listening to recitation.

3. Accepts or uses student's answer or idea.
4. Asks questions about content (what? where? when?): wants to find out whether student knows and understands material.

4A. Asks questions that stimulate thinking (why? how?): encourages student to seek explanations, to reason, to solve problems.

5. Lectures, gives facts or opinions about content: gives information in discussion, recitation, or committee meeting.
6. Gives directions, commands, or orders with which student is expected to comply.
7. Criticizes or justifies authority: disapproves of conduct or work of student or group of students.
10. Is not participating in class activities: is giving test or is out of room—class silent or in confusion.

LDR: Leader-director—teacher initiative—active: conducts recitation or discussion, lectures, works with small groups.

RES: Resource person—student-centered, lesser role than leader: helps group or committee, brings material, suggests.

SUPV: Supervisor—teacher initiative, passive, role during seatwork: circulates to observe and help.

SOC: Socialization agent: points to and reinforces social expectancies and rules; criticizes behavior.

EVL: Evaluator: listens and gives mark for oral report, individual or group; asks, "How many did you get right?"

The population sample consisted of 72 fifth-grade pupils and their teachers. Pupils were identified as either underachievers or achievers by obtaining a regression equation for each pupil using IQ and grade point averages. Then 36 underachievers were paired with 36 achievers in terms of scores on the "Reading Vocabulary" and "Reading Comprehension" sections of the *Cali-*

fornia Achievement Test. Using an electrically powered Bales-Gerbands recorder (1948), two-man teams categorized the behavior of pupils and teachers in two-minute units. In all, 2,410 two-minute samples were observed. To obtain a measure of interobserver reliability, each of the number of seconds for each category during the same observation was compared. A mean product-moment coefficient of 0.97 was obtained for the student categories and of 0.94 for the teacher categories.

Perkins' data indicate that the behavior of underachievers in the classroom tends to be characterized by involvement in non-academic work and/or work in another academic area and that underachievers also exhibit distinctly more withdrawal behavior than achievers. Low academic achievement seems to be related to withdrawal on the part of the student and criticism on the part of the teacher. High academic achievement is associated with academic work-oriented behavior on the part of the student and role behavior on the part of the teacher which is designed to facilitate learning. The finding that underachievers and achievers differ significantly in three combined categories—intent on work in another curricular area (WOA), intent on work of non-academic type (WNA), and withdrawal (WDL)—seems to indicate a kind of withdrawal syndrome which is consistent with less formal observation of underachievers. When seen in relation to the teacher categories, it was found that this syndrome is related to the *teacher lecturer-criticizer* factor for both achievers and underachievers.

Smith and associates' study, *A Tentative Report on the Strategies of Teaching* (1964), extends and broadens earlier research into classroom behavior by Smith and associates. The new study, however, differs from the earlier one in some significant respects. For one thing, the basic units of analysis in the earlier study were the episode and the monologue; in the present one, a newly conceived verbal unit, the strategy, forms the basis of the analysis. In addition, two other units, the venture and the move, are used to help identify and clarify the concept of teaching strategies. The population sample is the same as in the study of logical operations, and the data are drawn from transcripts of tape recordings of 17 high school class sessions. The sample includes ninth-, tenth-, eleventh-, and twelfth-grade classes in English, mathematics, science, and social studies.

The first unit of discourse to be identified was the venture. A venture is defined as "a segment of discourse consisting of a set of utterances dealing with a single topic and having a single overarching content objective." Usually five or six such units of discourse may be found in a lesson. Since each venture is, in a sense, a self-contained unit, the identification of these units ensures that the strategies therein will not be fragmented as would be the case if time units were used. The identification of these units of discourse, however, constituted a possible source of unreliability which the investigators sought to minimize by developing a carefully worded set of criteria for identification. To determine reliability, four judges who were not involved in the development of the research were divided into two teams and presented with nine transcripts of class sessions. Each team identified the ventures in each lesson and the judgments of the two teams were compared. The coefficients of agreement for the nine classes ranged from 0.56 to 0.89, with a median of 0.70.

In order to facilitate the identification of strategies, ventures were classified as to their cognitive import, that is, their central meaning or theme. The investigators are careful to point out that in using the term *content objective* to describe the import of the venture they are referring neither to the teacher's intent in initiating the unit of discourse nor to the learning that the student may acquire. Judgments of this kind would be highly speculative and, in all likelihood, quite unreliable.

The nine types of ventures identified by the investigators were described by Coombs * thusly:

> *Causal ventures.* The overarching content objective of this type of venture is a cause-effect relationship between particular events or between classes of events. A cause of an event, in the sense in which 'cause' is used here, need be neither necessary nor sufficient to bring about the event. It may be only one factor contributing to or facilitating the event's occurrence.
>
> *Conceptual ventures.* The overarching objective of this type of venture is a set of conditions either governing, or implied by, the use of a term. These conditions constitute criteria for determining whether something is or is not a member of the class of

* Adapted from *Teaching Strategies and the Teaching of Concepts*, by Jerrold R. Coombs. Unpublished doctor's dissertation, University of Illinois, 1964. pp. 22-40.

things and the criteria by which members of the class are identified together with a term that names the class.

Evaluative ventures. The objective of this type of venture is a rating of an action, object or event, policy, or practice, or a rating of a class of such things with respect to its worth, goodness, correctness, and the like. Discussion in ventures of this type usually attempts to determine whether or not some action, etc., is to be placed in a particular value category.

Informatory ventures. The informatory venture has as its objective a body of information which clarifies or amplifies a specified topic or group of related topics. The central concern of the discussion in this type of venture is the answering of questions such as "What happened?" "When did it happen?" "What did it do?" "Who or what did it?" or "What is it like?"

Interpretive ventures. The objective of this type of venture is the meaning or significance of a set of words or symbols.

Procedural ventures. A venture of this type discloses a sequence of actions by which an end may be achieved. The sequence of actions may be related to solving a problem, making a produce, or bringing about a certain type of event.

Reason ventures. A venture falling into this category discloses the reason or reasons for an action, decision, policy, or practice. As used here, the term 'reason' refers to a consideration which leads a person to perform an action or which justifies his performing the action.

Rule ventures. The objective of this type of venture is a rule or several related rules. The term 'rule' as it is used here refers to conventional ways of doing things and to analytic relationships which may be used to guide actions.

System ventures. This type of venture focuses on the functional relations of the parts of a mechanism that produces a given end.

The procedure for assessing reliability in classifying ventures into these categories was essentially the same as for identifying ventures in the transcripts of the discourse. Independent judges were trained in identification procedures and were presented with 28 ventures to classify. The two teams were in agreement on 22 of the ventures. Taking each of the types of ventures separately, the coefficients of agreement ranged from 0.67 to 1.00 with the exception of causal ventures where there was no agreement between the two teams. The median cofficient was 0.75.

Once a system for identifying and classifying ventures had been developed, the next task was to define and clarify the con-

cept of strategy as a unit of classroom behavior. Essentially a strategy was seen as "a set of verbal actions that serves to attain certain results and to guard against others." * Two basic dimensions of strategy were identified. The first, called the treatment dimension, involves those classroom operations which are designed to present and structure what is to be learned. The focus here is essentially substantive in the sense that the presentation of content is central to the activity. The second dimension, the control dimension, is concerned essentially with the teacher's attempts to guide or control student behavior. In pursuing the analysis of teaching strategies, Smith and his associates choose to concentrate on the treatment dimension.

Initially, the conceptual venture was singled out for analysis in terms of the treatment dimension. One task was the identification of the kinds of content that are characteristic of a conceptual venture. In this type of venture, the emphasis is upon definition, the ways in which the term may be used. Ten kinds of content were identified as contributing to this objective: **

1. A part the referent has
2. A characteristic of the referent
3. A function of the referent
4. A characteristic use of the referent
5. A characteristic treatment accorded the referent
6. A physical relationship between the referent and something else
7. The way in which the referent compares to something else with respect to a particular characteristic
8. The evaluative rating implied by the use of the term
9. A condition necessary or required to produce or cause the referent
10. The results of an operation involving the referent.

The second task was identifying and classifying the kinds of verbal maneuvers that are used in conjunction with these aspects of content. Such a verbal maneuver was described as a move

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* *Ibid.*, p. 50.

** *Ibid.*, p. 55.

and defined as "a verbal activity which logically or analytically relates terms of the proposition set forth by the strategy to some event or thing or to some class of events or things." For conceptual ventures, 18 types of moves were identified:*

1. *Criterion description.* Individual criteria are simply noted or discussed. The criteria are not implied in the course of some more complex maneuver such as comparing or contrasting the referent with something else or proving something to be an instance of the referent.

2. *Analysis.* A set of parts which, together, constitute the referent is noted or discussed.

3. *Enumeration.* The instances to which the term applies are noted or an exhaustive set of sub-classes of the referent is noted or discussed.

4. *Classification.* The referent is identified as a sub-class of a larger class of things.

5. *Classificatory description.* The referent is classified as a sub-class of a more inclusive class of things and is uniquely identified within that class.

6. *Analogy.* The way in which the referent is like something else is noted or discussed. In some cases, however, the way in which the referent is like the other thing may not be discussed. The similarity is simply noted.

7. *Differentiation.* The difference between the referent and something else is noted or discussed.

8. *Negation.* That the referent is not something else or not the same as something else is noted, but there is no discussion of why the referent is not the same as the other thing.

9. *Opposition.* The opposite of the referent is noted or discussed.

10. *Sufficient conditions.* A set of conditions represented as being sufficient to identify something as an instance of the referent is noted or discussed.

11. *Instance production.* The way in which an instance of the referent may develop or be produced is noted or discussed.

12. *Positive instance.* A particular instance of the referent is noted or discussed.

13. *Negative instance.* A particular object, situation or event which is not an instance of the referent, but which is similar enough to the instance to be easily mistaken for it is noted or discussed.

* *Ibid.*, pp. 56-59.

14. *Instance substantiation.* A positive or negative instance is pointed out, named, or described and the reasons or evidence for concluding that it is a positive or negative instance are discussed.

15. *Instance comparison.* Two or more instances to which the term applies are named or described and the similarities or differences between the instances are noted or discussed.

16. *Instance variance.* One or more positive instances and one or more negative instances, each negative instance differing from a positive instance with respect to only one condition, are noted or discussed.

17. *Operation variance.* This sort of move establishes a criterion involving an empirical correlation. Suppose the term refers to a relationship between two factors. In an operation variance move an operation involving these factors is performed. In this operation the values of the independent variables are known and the values of the dependent variables are noted. The operation is repeated, but with one independent variable, call it variable *A*, having a different value. Changes in the values of the variables involved in a relationship referred to by the term are noted. This same operation may be repeated several times, with variable *A* having a different value each time. Finally, a conclusion is reached concerning the effect a change in the value of *A* has on the relationship or on the value of the variables in the relationship.

18. *Meta distinction.* In this sort of move the different uses of a term, the kinds of meaning a term can have, the types of conditions which may be associated with the term are noted or discussed.

This list may be divided into two broad categories of moves: instancing moves and abstract moves. The former includes positive instance, negative instance, instance production, instance substantiation, operation variance, instance variance, instance comparison, and enumeration. The latter includes criterion description, classification, analogy, differentiation, classificatory description, negation, opposition, sufficient conditions, and meta distinction. Strategies consist essentially of combinations of various kinds of moves but may occasionally comprise only a single move. Smith and his associates have tentatively identified four types of strategies representing certain groupings of conceptual moves. Their descriptions in abridged form are listed below (1964, pp. 60-84):

Type I Strategies

Strategies of this type consist entirely of abstract moves.

Sub-type A. These are strategies which contain only one move.

Sub-type B. A strategy of this type contains an initial abstract move (other than a criterion description move) supplemented by one or more criterion description moves.

Sub-type C. This strategy is one which begins with a series of criterion description moves and culminates with a different type of abstract move.

Sub-type D. Strategies of this type contain both criterion description moves and other abstract moves. However, rather than being grouped at the beginning or at the end of the strategy, the criterion description moves are interspersed with other abstract moves.

Type II Strategies

In Type II, one or more abstract moves are followed by one or more instancing moves.

Type III Strategies

These strategies consist of one or more instancing moves followed by one or more abstract moves.

Type IV Strategies

Type IV consists of mixed strategies.

Each of these strategies, then, represents a different patterning of moves within a conceptual venture. Taken together, they may be seen as four different tactics for achieving the same kind of content objective.

In this preliminary stage of their research, Smith and his associates have developed a framework and set of concepts which may be used to describe and analyze the classroom discourse associated with achieving content objectives. The notion of strategies provides a means of conceptualizing the verbal maneuvers that are involved in this aspect of teaching behavior. Further research may be directed toward establishing relationships between certain kinds of strategies and of measurable outcomes.

Like the researchers in the study just reviewed, Taba, Levine, and Elzey in *Thinking in Elementary School Children* (1964) are concerned with cognitive processes, but their approach is considerably different. Taba and her associates are

interested in assessing the role of curriculum organization and teacher training instituted for achieving a higher level of thinking in elementary school children than is usually the case.

In addition, Taba and her associates developed a concept of thinking and instruments by which cognitive processes could be measured, analyzed, and observed. They began with the notion that thinking is "an active transaction between the individual and the demands of his environment, which is neither fully controlled by environmental stimulation, nor wholly independent of some mediating intervention" (p. 21). Also basic to their concept of thinking is the idea that thinking may be seen as occurring in sequential steps, which suggests that there may be an optimum sequence of learning experiences in the development of thinking processes. After an exhaustive study of the research and literature in this area, the investigators identified three clusters of cognitive processes: "1) grouping and classification of information; 2) interpretation of data and the making of inferences; and 3) the application of known principles and facts to explain new phenomena, to predict consequences from known conditions and events, or to develop hypotheses by using known generalizations and facts" (p. 30).

These cognitive processes were analyzed from two different points of view: their basic elements and the ways of mastering them. The first of these processes, concept development, is seen as comprising three basic operations: differentiation as to the properties of the objects or events, grouping or assembling these properties as to certain characteristics, and labeling the categories. In terms of parallel classroom operations, differentiation involves enumerating on the basis of previous experience or a classroom presentation; grouping may take the form of putting together items with varying characteristics; and labeling can occur as a form of decision making involving the hierarchy of concepts as to their generality.

The second process, interpreting data and making inferences, is seen as involving the operations of gathering or collecting the information, offering reasons or explaining, establishing relationships among certain kinds of information, and, finally, generalizing on the basis of these relationships.

In analyzing the third cognitive task, involving the application of principles, predicting consequences, and using generaliza-

tions and facts, Taba and her associates identify two basic operations: prediction itself and the development of appropriate ways to test the validity of prediction.

In spite of these differences in operation, the three cognitive tasks are seen as having certain things in common. In the first place, these tasks all involve a series of steps. Second, these steps may be seen as a kind of hierarchy of abstraction and complexity. Third, each of the operations involves different levels of intuitive as well as conscious awareness of the operational principles.

This conceptualization of cognitive tasks provided the framework for much of the training of the 20 teachers involved in the study. Each teacher was given 10 days of training, during which special attention was given to the development of cognitive skills in elementary social studies classes. The 20 classes involved included grades 2 through 6. In all, 481 students were involved representing a range in IQ of 88 to 121 and a broad range as to socioeconomic status.

Two instruments were developed for the purpose of measuring and analyzing aspects of cognitive skills. The first is the Social Studies Inference Test which is designed to test the students' ability to draw inferences from new data. Four subareas were identified: discrimination, inference, overgeneralization and caution, and error.

The second instrument is a coding system designed to analyze tape recordings of the class sessions. Four tape recordings were taken for each class. The first was of the discussion involving grouping and classification; two others involved interpretation of data; the fourth involved predicting consequences. Thought units in the typescripts of the class sessions were subjected to a threefold analysis which included *designation,* whether the source was a teacher or a pupil and whether information was sought or given; *function,* whether the unit was related to managerial matters or involved content and thought processes; and *levels,* the relative concreteness or abstraction of the unit. One of the major purposes for devising the coding system was to provide for the tracing of patterns in the development of cognitive skills as it actually occurs in the classroom. Using the system, it became possible to map teaching strategies on a flow chart and to determine, for example, where the teacher sought to extend one level of thought and to "lift" it to another and higher level.

Taba and her associates (1964) summarize their system as follows (pp. 118-19):

*Cognitive task: Grouping and labeling**

(giving or seeking)

10 specific or general information outside of focus
11 specific or general information within focus
12 specific or general information with qualifications*
30 grouping information without basis
31 grouping information with implicit basis
32 grouping information with explicit basis
40 categorizing information without basis
41 categorizing information with implicit relationships between items
42 categorizing information with explicit relationships between items

Cognitive task: Interpreting and making inferences

(giving or seeking)

10 specific or general information outside of focus
11 specific or general information within focus
12 specific or general information with qualifications and relationships
50 specific reason or explanation that does not relate to the information
51 specific reason or explanation that relates or organizes the information
52 specific reason or explanation that states how it relates or organizes the information
60 irrelevant or incorrect inference which is derived from information
61 relevant inference which is derived from information
62 relevant inference which is derived from information and expresses a cause-and-effect relationship, explanation, consequence, or contrast
70 relationship between information which implies an irrelevant or incorrect principle or generalization
71 relationship between information which implies a principle or generalization

* Categories in the 20 series were originally reserved for "general information" but were later combined with the 10 series.

72 principle or generalization which is derived from information

Cognitive task: Predicting consequences
(giving or seeking)

90 correcting the cause or condition

Establishing parameters of information

100 irrelevant information

101 relevant information for establishing the parameter (if-then) for a particular hypothesis or prediction

102 relevant information for the parameter or any particular prediction with appropriate explanation

Establishing parameters of conditions

110 irrelevant or untenable condition for the logical parameter or for the particular prediction or hypothesis

111 relevant condition without connecting it with relevant information

112 relevant condition and information and plus a logical connection between them

Prediction: (Level one, (100), immediate consequences)
(Level two, (200), remote consequences)

120-220 incorrect or out of focus prediction

121-221 prediction with no elaboration

122-222 prediction accompanied by explanation, qualification, differentiation, comparison, or contrast

123-223 prediction accompanied by a stated or implied principle.

To determine reliability, two members of the staff coded a transcript independently. After an adjustment in the system involving the collapsing of certain categories, 90 percent agreement was achieved between the two coders.

The results of the analysis are in terms of changes in the measures of cognitive skill and are also descriptive of the teaching strategies that were employed to bring about these changes. Taba points out, for example, that although the emergence of formal thought appears earlier than at first believed (second grade), a continued emphasis on concrete operations in the early grades serves as a foundation for the more complex operations to follow. Appropriate teaching strategies seem to ease the transition from concrete to formal operations considerably, and the fact that there is a low correlation between cognitive perform-

ance and IQ indicates that effective teaching strategies may be developed for both high- and low-ability students. Probably most significant here is the conclusion that the development of higher levels of cognition is an attainable educational objective.

The six research studies reviewed here share a kind of common perspective. It is that some insight and understanding may be gained into the nature of teaching by studying it in the classroom setting. Despite this common orientation, considerable diversity is represented here as well. This diversity results in part from the predilections of the investigators and partly from the many-faceted nature of teaching itself. Something of the range represented in these six studies may be seen in terms of the dimensions of focus, population and setting, and technique or observational procedure.

Principal Investigator	Focus	Population and Setting	Procedure
Bellack	classroom language; meaning	high school social studies	typescripts; tape recordings
Jackson	teacher-pupil communication	private elementary school	direct observation
Waimon	observation as teacher training	upper elementary grades	direct observation, tapes; typescripts
Perkins	role behavior; class activity	fifth-grade underachievers	direct observation
Smith	teacher strategies	high school	typescripts
Taba	cognitive skills	elementary social studies	typescripts

It is difficult at this early stage of the game to evaluate these studies in terms of the ultimate contribution they will make to a useful description of the teaching process—a description which, it is hoped, will provide some basis for teaching theory. But it is in these terms, rather than in terms of the narrowly practical, that these studies must be seen. It may be that our insistence on research which has immediate practical application has kept us from conducting the kind of patient and painstaking analyses of teaching that can shed light on that highly complex human activity. If so, the fact that these studies raise more questions than they attempt to answer is a highly desirable turn of events.

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